EXECUTIVE SUMMARY

INTRODUCTION

This joint environmental impact statement/environmental impact report (EIS/EIR) evaluates the impacts on the environment that could result from the proposed Bolinas Lagoon Ecosystem Restoration Project, which would involve the removal of up to 1.5 million cubic yards (cy) of sediment from the bottom of Bolinas Lagoon. This estuarine lagoon is in Marin County, California, 12 miles northwest of San Francisco (Figure 1-1). The lagoon is owned by Marin County and is administered by Marin County Open Space District (MCOSD) and also falls within the jurisdictional boundaries of the Gulf of the Farallones National Marine Sanctuary (GFNMS).

This EIS/EIR has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), (42 United States Code §§ 4321-4347 [1994]); the Council on Environmental Quality regulations implementing NEPA [40 Code of Federal Regulations [CFR] Parts 1500-1508); the California Environmental Quality Act (CEQA) of 1970, (California Public Resources Code [Cal. Pub. Res. Code] §§ 21000-21178.1), and implementing guidelines (California Code of Regulations title 14, §§ 15000-15387 [1999]), the US Army Corps of Engineers (Corps) NEPA Guidelines (33 CFR Part 230, 32 CFR Chapter 11), the National Marine Sanctuary Program Regulations, 15 CFR, Part 922, Subpart M, and the Marin County CEQA guidelines.

This EIS/EIR is being written as part of the Corps and MCOSD's Bolinas Lagoon Ecosystem Restoration Feasibility Study, which will evaluate the financial, environmental, and engineering feasibility of undertaking a sediment removal project in Bolinas Lagoon. The Corps is the lead NEPA agency, and MCOSD is the lead CEQA agency. Marin County owns Bolinas Lagoon Open Space Preserve, and MCOSD administers it with the technical advice and support of the Bolinas Lagoon Technical Advisory Committee. MCOSD and the Corps of Engineers are jointly funding the study, which will examine the effects of remediation strategies that counteract the long-term effects of sedimentation and will compare them with the alternative of taking no

action against sedimentation. The Bolinas Ecosystem Restoration Feasibility Study (FS) is hereby incorporated by reference.

The EIS/EIR addresses the environmental impacts of two action alternatives and the No Action Alternative (called the No Project Alternative under CEQA). The two action alternatives consist of sediment removal and upland excavation sufficient to remove 1.5 million cy of sediment from Bolinas Lagoon, in order to restore the lagoon's sensitive intertidal and subtidal habitats to a self-sustaining condition.

Marin County and community residents near the proposed project area have identified certain resources to be of particular importance: Biological resources, geological resources, water quality, visual resources, and recreational resources. Project success is also a major concern.

PURPOSE AND NEED (CHAPTER 1)

Bolinas Lagoon fulfills a vital function in the California coastal ecosystem: It provides productive and diverse estuarine habitat for fish, waterfowl, shorebirds, marine mammals, and other wildlife and serves as an important stopover point for birds on the Pacific Flyway. Bolinas Lagoon has been filling in at an accelerated rate as a result of human activity since European colonization, and the mouth of the lagoon is predicted to begin closing intermittently within the next 50 years. The result of these closures would be a disruption in the flow of water in the lagoon, and the lagoon's value as estuarine habitat would decline. Uses of the lagoon for recreation, research, and foraging and breeding by sensitive species of birds, fish, and marine mammals would all suffer because of this decline in habitat volume.

The goals of this project are to increase tidal volume and to restore intertidal and subtidal habitat in Bolinas Lagoon to historic levels, in a manner that prevents the need for regular maintenance dredging during the project period. The lead agencies have evaluated the best available bathymetric data and aerial photographs of the lagoon to develop alternatives that would shift the lagoon's intertidal and subtidal volumes back to a point that is closer to where the lagoon would have been without the accelerated sedimentation rates of the past 150 years. Historical data helped to keep the design parameters within the historical context. That is, the alternatives were designed in a manner that allowed changes in intertidal and subtidal volume to be kept proportional so as not to create an "unnatural" condition in the lagoon. With these changes, the lagoon would have larger volumes of intertidal and subtidal habitat and increased tidal flow, which would in turn delay the potential closure of the inlet and would preserve the lagoon's valuable intertidal and subtidal habitats. Additional benefits of this project include preserving the lagoon for recreational uses and scenic value.

This project would address the impact of human activity on the lagoon and is intended to result in a lagoon that is neither fixed and unchanging nor in need of regular maintenance. On completion of the project, the lagoon would remain subject to natural

variations in tidal volume, sediment input, seismic activity, and weather conditions but with a lower baseline of sediment than has existed since the mid-1950s.

PUBLIC INVOLVEMENT PROCESS

Public involvement is a key part of the EIS/EIR process. Methods to involve the public in the EIS/EIR process have included or will include the following:

- Publishing notices of public meetings in newspapers with a wide circulation and encouraging written comments;
- Publishing a notice of intent (NOI) in the Federal Register on April 9, 1998 (63 Fed. Reg. 17392); the NOI was sent to the California State Clearinghouse for distribution to state agencies. Its purpose is to notify the public that an EIS will be prepared and considered (40 CFR § 1508.22). The NOI also solicited guidance from these agencies as to the scope and content of the environmental information to be included in the EIR (CEQA Guidelines § 15375). A notice of preparation (NOP) was also prepared to notify the responsible, trustee, and involved federal agencies that an EIR will be prepared. The NOP was published on April 17, 2000, and the project was assigned the California State Clearinghouse Number of 2000042055.
- Sending scoping letters and project information to public agencies, public interest groups, and individuals;
- Holding a public hearing on scoping for the Bolinas Lagoon Ecosystem Restoration Feasibility Study on April 16, 1998, at the Stinson Beach Community Center; this meeting was attended by agency representatives and members of the public;
- Holding public informational meetings at the Stinson Beach Community Center on November 4, 1999, and November 30, 2000, and at the Bolinas Community Center on December 2, 2000, in order to keep the local community informed of the status of the Bolinas Lagoon Ecosystem Restoration Feasibility Study;
- Creating and maintaining a mailing list to disseminate information about the decision-making process;
- Making the draft and final EIS/EIR available to the public online at http://www.spn.usace.army.mil/projects/bolinas.html;
- Holding two public hearings on the draft EIS/EIR and providing a 45-day comment period; and
- Circulating the Final EIS/EIR for thirty days for public review of the adequacy of the responses to comments on the draft EIS/EIR.

Areas of Controversy

Key issues that were raised during the community scoping process were taken into account, and those public comments on issues relevant to the NEPA/CEQA process have been incorporated into this draft EIS/EIR's analysis. These issues are not necessarily controversial, but they represent issues of concern to the community.

In Appendix A is a summary table of the major issues of concern, the individuals who expressed concern, and the general locations in this document where the concerns are addressed. Written comments taken during the public scoping process for the draft EIS/EIR have been summarized into key issues of importance. Only issues that raise significant environmental impact concerns are addressed in the EIS/EIR, as provided in NEPA, the CEQ regulations for implementing NEPA, CEQA, and the CEQA guidelines. The issues are summarized below.

- Sources of sediment in the lagoon: Many commenters believe sediment buildup in the lagoon is continuing and is a result of erosion in the watershed. However, the watershed study commissioned by the Corps in 2001 (see Technical Appendix A) showed that erosion in the watershed is only a minor source of sediment in the lagoon.
- Need for watershed-level action: Some members of the public commented that the lagoon's sedimentation problems stem from erosion in the watershed. Many commenters have requested that the project include watershed-level actions to resolve erosion. Given the conclusions of the watershed study, the lead agencies have opted not to pursue watershed-level actions because the watershed is not a significant source of sediment for the lagoon.
- Appropriateness of dredging: Some commenters argued that the Corps has chosen the dredging option too swiftly and that further studies are needed to determine whether less invasive methods might restore the lagoon.
- Human activities that have affected the lagoon: Some stakeholders argue that the project should be focused on repairing the damage that human beings have done to the lagoon, particularly by removing the Caltrans turnouts, the upland area in PGC Delta, and some of the areas filled when the Seadrift development was constructed in the 1960s.
- Seadrift: Some commenters want the Seadrift Lagoon opened up to public access. Other commenters believe that the construction of Seadrift itself was the beginning of the lagoon's major problems.

Public Review

The public review period for this draft EIS/EIR is 45 days under both CEQA and NEPA; comments will be responded to in a final EIS/EIR. NEPA provides for a 30-day no action period after publication of the final EIS.

Draft EIS/EIR

The public is invited to review and comment on this draft EIS/EIR. The Corps and Marin County will publish a notice of availability in the Federal Register and in the local press. Public notices or copies of the EIS/EIR will be mailed to agencies with jurisdiction and private individuals or organizations that have expressed an interest in the project. Marin County will file a notice of completion (required under CEQA) with the State Office of Planning and Research. On the day the notice of completion is filed, the 45-day public comment period will begin, which will provide the public with an opportunity to review the document and to offer comments.

The public is invited to send written comments on the draft EIS/EIR to Tim Haddad, Marin County Community Development Agency, 3501 Civic Center Drive, San Rafael, CA 94903, and to Roger Golden, US Army Corps of Engineers, San Francisco District, 333 Market Street, 7th Floor, San Francisco, CA 94105.

Two public hearings will be held during the 45-day review period to hear comments on the draft EIS/EIR. The time and place of the hearings will be announced in the media and are noted in the transmittal letter accompanying this document.

Final EIS/EIR

A final EIS/EIR, in which the comments received on the draft EIS/EIR are discussed, will be published and made available for review. A notice of availability of the final EIS/EIR will be published in the Federal Register and in a public notice.

During the NEPA 30-day no action period, the public and agencies may comment on the adequacy of responses to comments and the final EIS/EIR. After that time, the Corps will sign a record of decision, detailing their decision regarding the proposed project. This 30-day period will also fulfill Marin County's requirement for a final EIR public review and comment period before the Planning Commission considers it for recommendation to the Board of Supervisors for Certification of the final EIS/EIR as complete and adequate. The Planning Commission will consider its recommendation for certification of the final EIS/EIR (and any comments and responses on the final EIS/EIR as an amendment to the final EIS/EIR) in a public meeting, before they consider their recommendation for action on the project to the board. The final EIR will be presented to the Marin County Parks, Open Space and Cultural Commission for recommended action on the EIS/EIR and the project, then to the Board of Directors of MCOSD for certification and final action during or after the 30-day federal review period.

PROPOSED ACTION AND ALTERNATIVES (CHAPTER 2)

The alternatives consist of two project alternatives, which would both remove over 1,400,000 cy of wet sediment and upland fill from selected areas all over the lagoon, and the No Action/No Project Alternative. Aspects of the project alternatives that have yet to be fully developed include construction planning, scheduling sediment removal, and identifying specific adaptive management techniques to evaluate and

respond to changes in the lagoon ecosystem and hydrology as a result of project activity.

The two project alternatives are similar and vary only with regard to excavation in Pine Gulch Creek Delta (PGC Delta) and the total amount of sediment and vegetation to be removed from the project area. Schedules have yet to be finally determined, but wildlife using the lagoon may limit construction to only a few months in the summer and fall. The two project alternatives are known as the Riparian Alternative and the Estuarine Alternative. The Estuarine Alternative is identified in the Bolinas Feasibility Study as the National Ecosystem Restoration Plan, and the Riparian Alternative is identified as the Locally Preferred Plan, because it was developed in consultation with local scientists and stakeholders.

Section 2.5 of this report, and Sections 4, 5, and 6 of the Feasibility Study, discuss the development of alternatives which were considered and removed from consideration.

Riparian Alternative

Both project alternatives would involve removing wet sediment from locations all over the lagoon and dry soil and vegetation from the adjacent upland. In some areas vegetation, including mature trees and shrubs, would be removed. As many as 100 acres of jurisdictional wetlands would be converted to lower intertidal or subtidal habitat. Full construction is estimated to take three to four months per year for up to nine years; the short construction periods are designed to limit impacts on sensitive species in the lagoon. Construction schedules have not yet been developed, but for the purposes of this EIS/EIR, construction is estimated to require approximately 60 working days per year, including 33 days of round-the-clock dredging per year. Wet sediment would be removed from the lagoon floor by a cutter head suction dredge, which would remove sediment in a liquid slurry from the floor of the lagoon, while upland soils would be removed by land-based excavators. The slurry would be pumped from the dredge through a flexible pipeline over the end of Stinson Beach sand spit to one of two transport barges, or scows, anchored in Bolinas Bay. Once filled with slurry, each scow would be towed by a tugboat to the San Francisco Deep Ocean Disposal Site (SFDODS), which is roughly 55 miles away, west of the Farallon Islands.

Upland sites would be excavated with land-based excavating machinery, such as bulldozers, loaders, and cranes. The removed materials would be dry and therefore could be transported by dump trucks rather than by barge. The disposal location for dry soil is the Redwood Landfill in Novato, California. Vegetative debris removed from upland sites would also be disposed of at Redwood Landfill.

Sediment removal in the lagoon under this alternative would reopen old channels or create new ones to increase hydraulic exchange within the lagoon. Under the Riparian Alternative, dredging would take place in the lagoon in the North Basin, Main Channel, Kent Island, Bolinas Channel, Pine Gulch Creek (PGC) Delta, and South Lagoon

Channel. Additionally, dry land excavation would take place at Dipsea Road, the Highway 1 fills, and PGC Delta.

Based on the expected volume of material to be dredged and the dredge's average rate, 300 days of round-the-clock dredging would be needed to complete the dredging element of this alternative. Over nine years, this averages out to 33 days per year of dredging.

Limited dredging windows are available, based on sensitive species activity in Bolinas Lagoon. An open window for excavation in PGC Delta exists between July and October; an open window for Kent Island exists between August and September. The Highway 1 fills, Dipsea Road, and the South Lagoon Channel could be excavated any time between August and February, but there are no open windows for excavation in the Bolinas Channel, the Main Channel, or the North Basin. The lead agencies will consult with the US Fish and Wildlife Service, National Marine Fisheries Service, the California Department of Fish and Game, and GFNMS to identify dredging windows for these areas that minimize impacts on sensitive species. Based on sensitive species activity, it is likely that most excavation in the lagoon would take place between July and October.

Table ES-1 shows excavation information by project element.

Estuarine Alternative

The Estuarine Alternative is identical to the Riparian Alternative except for the excavation in PGC Delta; excavation under the Estuarine Alternative would take out greater amounts of vegetation, upland soils, and wet sediment than under the Riparian Alternative. This would require removing 11 acres of intertidal and upland habitat in the delta, including 7 of the 17 acres of riparian habitat in the delta. More jurisdictional wetlands would be lost under this alternative, possibly as much as 10 acres more than under the Riparian Alternative. Implementing the Estuarine Alternative is estimated to last approximately nine years, and a somewhat greater amount of wet sediment would be taken out of the lagoon. The same types of machinery and disposal locations would be used, and the same schedule limitations would apply.

Table ES-2 provides a summary of excavation information by project element for the Estuarine Alternative.

No Action/No Project Alternative

The No Action/No Project Alternative would entail taking no further action to address sedimentation in the lagoon but would leave in place existing management plans and policies. This would include the Bolinas Lagoon Management Plan, existing management plans and policies administered by other authorities, such as GFNMS, GGNRA, and Pt. Reyes National Seashore, as well as applicable state and federal resources management laws and regulations. Evaluating this alternative includes

determining the future impact of these plans and policies in the absence of any dredging or other sediment removal activities in the lagoon.

Table ES-3 compares the results of the two project alternatives with the No Action Alternative, and Table ES-4 compares long-term impacts on habitat totals in the lagoon.

Environmentally Superior Alternative

NEPA requires that an environmentally preferable alternative be identified, and CEQA requires that an environmentally superior alternative be identified. The Riparian Alternative would be the environmentally superior alternative, because this alternative would achieve the project goals, unlike the No Action Alternative, and would create fewer impacts as compared to the Estuarine Alternative. The Riparian Alternative would result in seven significant and unmitigated impacts and 11 significant but mitigated impacts, compared to the Estuarine Alternative, which would result in eight significant and unmitigated impacts and 14 significant and mitigated impacts. The Riparian Alternative would meet the project goal of increasing tidal volume in Bolinas Lagoon, would in the long term produce the same acreages of subtidal and intertidal habitat as the Estuarine Alternative, would result in fewer significant impacts, would result in the loss of ten fewer acres of jurisdictional wetlands, and would not conflict with the Marin County Local Coastal Plan.

Table ES-1
Riparian Alternative Project Elements

	Excavation Footprint (acres)	Excavation Volume (wet and dry) (cy)	Volume of Vegetative Debris (cy)	Deepest Level of Excavation (NGVD)[1]	Days of Dredging (at 200 cy/hour, 24 hours/day)	Barge Loads to SFDODS	Truckloads of Dry Soil to Redwood Landfill	Truckloads of Chips to Redwood Landfill
North Basin	136	458,550 (wet)	N/A	-4 ft	96	612	N/A	N/A
Main Channel	38	216,250 (wet)	N/A	- 4 ft	45	289	N/A	N/A
Bolinas Channel	16	130,800 (wet)	N/A	- 5 ft	28	175	N/A	N/A
Kent Island	124	376,750 (wet)	3,800	- 2 ft	79	503	N/A	320
Pine Gulch Creek Delta	86	149,100 (wet), 9,550 (dry)	850	- 1 ft	31	199	800	71
Highway 1 Fills	4	4,800 (dry)	N/A	0 ft	N/A	N/A	405	N/A
Dipsea Road	8	37,700 (dry)	N/A	0 ft	N/A	N/A	3150	N/A
South Lagoon Channel	18	89,250 (wet)	N/A	- 4 ft	19	119	N/A	N/A
Totals	430	1,420,700 (wet), 52,050 (dry)	3,800	N/A	296	1897	4,355	391

[1] NGVD is the land datum typically used on US Geological Survey topographic maps. NGVD is commonly referred to as mean sea level because it was based on the average of the mean tide levels at selected locations. However, because it is a national datum, 0 ft NGVD may not necessarily equate to mean sea level in Bolinas Lagoon.

Table ES-2
Estuarine Alternative Project Elements

	Excavation Footprint (acres)	Excavation Volume (wet and dry) (cy)	Volume of Vegetative Debris (cy)	Deepest Level of Excavation (NGVD)[1]	Days of Dredging (at 200 cy/hour, 24 hours/day)	Barge Loads to SFDODS	Truckloads of Dry Soil to Redwood Landfill	Truckloads of Chips to Redwood Landfill
North Basin	136	458,550 (wet)	N/A	-4 ft	96	612	N/A	N/A
Main Channel	38	216,250 (wet)	N/A	- 4 ft	45	289	N/A	N/A
Bolinas Channel	16	130,800 (wet)	N/A	- 5 ft	28	175	N/A	N/A
Kent Island	124	376,750 (wet)	3,800	- 2 ft	79	503	11,000	320
Pine Gulch Creek Delta	103	155,950 (wet), 34,750 (dry)	11,300	- 1 ft	31	208	2,900	950
Highway 1 Fills	4	4,800 (dry)	N/A	0 ft	N/A	N/A	405	N/A
Dipsea Road	8	37,700 (dry)	N/A	0 ft	N/A	N/A	3,150	N/A
South Lagoon Channel	18	89,250 (wet)	N/A	- 4 ft	19	119	N/A	N/A
Totals	447	1,427,550 (wet) 77,250 (dry)	15,100		298	1906	17,455	1,270

[1] NGVD is the land datum typically used on US Geological Survey topographic maps. NGVD is commonly referred to as mean sea level because it was based on the average of the mean tide levels at selected locations. However, because it is a national datum, 0 ft NGVD may not necessarily equate to mean sea level in Bolinas Lagoon.

Table ES-3
Dredging Alternative Results

Alternative	Volume of Excavated Material (cy)	Dredged Footprint (acres)	Lagoon Tidal Prism (cy)	Tidal Prism Compared to 1998 (cy)	Closure Index[1]
No Project (1998)	N/A		5,126,588	N/A	10.5
Estuarine Alternative (2008)	1,504,800	447	6,567,513	+1,440,925	8.1
Riparian Alternative (2008)	1,472,750	430	6,559,185	+1,432,597	8.1
No Action/No Project (2008)	0	0	4,883,508	-243,0800	11.2
No Action/No Project (2058)	0	0	3,841,791	-1,284,797	16.1

Source: Romanoski 2002

Note: [1]Inlet closure is possible at an index of 15.

Table ES-4
Lagoon Habitat Totals after Construction

Alternative	Subtidal Habitat Acreage	Subtidal Habitat Volume (cy)	Intertidal Habitat Acreage	Intertidal Habitat Volume (cy)	Upland Habitat Acreage
No Project (1998 conditions)	146.39	523,318	848.53	3,584,714	238.10
Estuarine Alternative					
2008	284.47	890,366	832.87	5,460,468	117.47
2018	205.82	627,984	873.01	5,355,085	165.11
2038	184.78	590,921	864.34	4,728,183	190.96
2058	166.01	557,866	856.61	4,169,080	214.01
Riparian Alternative					
2008	285.39	894,995	827.31	5,448,416	121.97
2018	205.41	627,264	872.84	5,342,896	165.61
2038	184.37	590,201	864.17	4,715,994	191.46
2058	165.6	557,146	856.44	4,156,891	214.51
No Action					
2008	134.45	502,281	843.61	3,228,889	252.77
2018	123.07	482,246	838.92	2,890,014	266.74
2038	102.03	445,183	830.25	2,263,112	292.59
2058	83.26	412,128	822.52	1,704,008	315.64

AFFECTED ENVIRONMENT (CHAPTER 3)

The affected environment section of the document describes the present physical conditions within the area of the proposed action. The area, or region of influence, is defined for each environmental issue based on the overall extent of physical resources

that may be affected directly or indirectly by the proposed action and appropriate guidelines of regulatory agencies or common professional practice. This section of the EIS/EIR describes the baseline conditions for each environmental resource against which the potential impacts of the proposed action are compared.

Environmental Consequences and major conclusions (Chapter 4)

The environmental consequences section of the document describes the potential significant environmental consequences, or impacts, of each alternative. Mitigation measures are also identified for any impact determined to be significant. The purpose of this section is to provide the public, interested agencies, and decision-makers with a clear understanding of the environmental impacts associated with the projects. In compliance with CEQA, any impacts that are determined to be significant and unmitigable are called out separately. Beneficial impacts are also described for each alternative. In the draft EIS/EIR, 22 separate direct and indirect significant impacts from the two project alternatives were identified. Cumulative impacts are discussed below.

Summary of Significant Unavoidable Adverse Impacts

Eleven separate unavoidable significant adverse impacts have been identified and analyzed for all three alternatives, and these impacts are summarized in Table ES-5. As discussed in the specific resource area discussions in Chapter 4, the project alternatives would result in seven or eight significant unavoidable environmental impacts. Table ES-5 summarizes the unavoidable significant impacts for the project alternatives and the No Action Alternative. These impacts are described in more detail in Table 2-7, which summarizes the potentially significant impacts of the project alternatives and the No Action Alternative.

Summary of Less than Significant Adverse Impacts

The significant impacts identified in the EIS/EIR that would be reduced to a less than significant level through the implementation of mitigation measures are as follows:

- Hydrology and groundwater—4.2.2 (Construction), 4.2.3 (Long-Term Circulation), 4.2.4 (Construction), 4.2.6 (Flooding);
- Biological—4.3.3 (California red-legged frog);
- Geology—4.4.1 (Erosion of the Tidal Inlet Channel and Banks), 4.4.2 (Inlet Channel Narrowing or Closure);
- Cultural—4.5.1 (Damage to Undiscovered Cultural Resources);
- Public access and recreation—4.6.1 (Lagoon Recreation Access), 4.6.2 (Lagoon Recreation Access);

Table ES-5
Significant Unavoidable Impacts

Riparian Alternative	Estuarine Alternative	No Action/No Project Alternative

Impact 4.2.1. Subsidence impacts from earthquake activity. A strong earthquake would cause liquefaction of the sand spit and probably a general leveling of the lagoon bottom, as well as widespread destruction of structures underlain by sandy sediments. While not an impact of the project, these conditions would form the backdrop for additional hydraulic effects related to the project.	Impact 4.2.1. Seismic and subsidence impacts. A strong earthquake would cause liquefaction of the sand spit and probably a general leveling of the lagoon bottom, as well as widespread destruction of structures underlain by sandy sediments. While not an impact of the project, these conditions would form the backdrop for additional hydraulic effects related to the project.	Impact 4.3.5. Loss of habitats. Under the No Action Alternative, sediment would continue to build up and fill in open water areas within the lagoon, which in turn would decrease the extent of tidal inundation, diminish water quality, and degrade existing habitat values. Over time, this would result in the loss of open water, salt marsh, riparian, and transitional habitats and associated plant and animal species.
Impact 4.3.1: Impact on Benthic Invertebrates. Dredging activities would directly disrupt benthic communities in the lagoon bottom and would indirectly affect animal life, such as birds and fish that feed on benthic invertebrates.	Impact 4.3.1: Impact on Benthic Invertebrates. Dredging activities would directly disrupt benthic communities in the lagoon bottom and would indirectly affect animal life, such as birds and fish that feed on benthic invertebrates.	Impact 4.2.5: Lagoon Closure. Under the No Action Alternative, the PGC Delta is projected to continue to aggrade and expand, and the tidal prism of the lagoon would continue to decrease. Temporary or intermittent closure of the inlet channel is predicted as soon as 2058. However, the changes in water quality and loss of a significant water resource (the lagoon) would be of a magnitude that would be considered significant if they were caused by human action.
Impact 4.3.2: Loss of Jurisdictional Wetland Approximately 100 acres of jurisdictional wetland would be destroyed and converted to mudflat or open water under this alternative.	Impact 4.3.2: Loss of Jurisdictional Wetland. Over 100 acres of jurisdictional wetland would be destroyed and converted to mudflat or open water under this alternative.	Impact 4.6.3. Long-term impacts: lagoon recreation access. Fishing and bird watching in the lagoon would be affected by the significant reductions in intertidal and subtidal habitat predicted by the Corps to result from taking no action to address sedimentation. Similarly, kayaking would be adversely affected by a reduction in subtidal and intertidal habitat and an expansion of upland habitat
Impact 4.3.3 Loss of Black Rail Habitat.: Excavation of salt marsh habitat would cause significant impacts to the state-listed as threatened California black rail.	Impact 4.3.3 Loss of Black Rail Habitat.: Excavation of salt marsh habitat would cause significant impacts to the state-listed as threatened California black rail.	

Table ES-5
Significant Unavoidable Impacts *(continued)*

Riparian Alternative	Estuarine Alternative	No Action / No Project Alternative
Impact 4.12.1. Alteration of terrain and water. During and after project construction, immediate impacts would include significantly altering the terrain of the lagoon by changing the lagoon shoreline at Pine Gulch Creek and Dipsea Road and along Highway 1; immediate impacts would also include changes in water flow, volume, location, and possibly color all through the lagoon.	Impact 4.7.2. Consistency with countywide plan and LCP. Because the Estuarine Alternative does provide for vegetation removal in the riparian protection area of Pine Gulch Creek, there would be a significant impact.	
Impact 4.12.2. Short-term changes in vegetation. Removal over 100 acres of upland habitat, including all the vegetation on Kent Island would significantly change the view from the eastern and northern shores of the lagoon, as well as from viewing locations along Highway 1 and along the hiking trails on Bolinas Ridge.	Impact 4.12.1. Alteration of terrain and water. During and after project construction, immediate impacts would include significantly altering the terrain of the lagoon by changing the lagoon shoreline at Pine Gulch Creek and Dipsea Road and along Highway 1; immediate impacts would also include changes in water flow, volume, location, and possibly color all through the lagoon.	
Impact 4.12.3. Long-term changes in vegetation. Compared to the No Action Alternative in 2058, this alternative would result in there being 100 fewer acres of upland habitat, 34 acres more of intertidal habitat, and 82 acres more of subtidal habitat.	Impact 4.12.2. Short-term changes in vegetation. Removing over 100 acres of upland habitat, including all the vegetation on Kent Island, would significantly change the view from the eastern and northern shores of the lagoon, as well as from viewing locations along Highway 1 and along the hiking trails on Bolinas Ridge. Impact 4.12.3. Long-term changes in vegetation. Compared to the No Action Alternative in 2058, this alternative would result in there being 100 fewer acres of upland habitat, 34 acres more of intertidal habitat, and 82 acres more of subtidal habitat.	

- Land use—4.7.1 (Compatibility with Uses at the Project Site);
- Air quality—None;
- Onshore traffic and transportation—None;
- Marine traffic and transportation—None;
- Noise—4.11.1 (Noise from Dredging), 4.11.2 (Noise from Vegetation Clearing Activity);
- Aesthetics and visual resources—4.12.4 (Light and Glare), 4.12.5 (Changes to Existing Visual Quality); 4.12.6 (Changes in Terrain);
- Public services and utilities—None; and
- Socioeconomics—None.

Effects Found to be Less Than Significant

The following issues have been found to be less than significant. These effects are discussed in Chapter 4, as required by NEPA.

- Air quality—Truck, dredging, and shipping emissions are well below the Clean Air Act conformity thresholds.
- Onshore traffic and transportation—None. Levels of service would not be exceeded for the preferred alternative of routing traffic along Novato Boulevard.
- Marine traffic and transportation—Ship traffic would not be impeded or delayed substantially in the project area.
- Public services and utilities—The project would not exceed current service capabilities and would not increase demand for public services.
- Socioeconomics—The project would not employ large numbers of people and would not increase the need for new housing. Impacts to local businesses, such as those geared to tourism, would be less than significant because excavation would be designed and timed to allow for continuing recreational activities.

Cumulative Impacts (Chapter 5)

Chapter 5, Cumulative Impacts, addresses what effects the proposed action would have on the environment, when combined with other past, present, and reasonably foreseeable actions. Reasonably foreseeable cumulative projects are listed and impacts are identified by resource category. Less than significant cumulative impacts from the project alternatives are discussed for hydrology and groundwater, biological resources, cultural resources, recreation resources, onshore transportation, noise, aesthetics and visual resources, public services and utilities, and socioeconomics.

OTHER REQUIRED ANALYSIS (CHAPTER 6)

The other required analysis section describes the impacts for other areas specifically required by NEPA and CEQA. These requirements consist of identifying and analyzing significant unavoidable impacts, growth-inducing impacts (NEPA/CEQA), the relationship between short-term uses and long-term productivity (NEPA), any irreversible or irretrievable commitment of resources (NEPA) or significant irreversible environmental changes (CEQA), and Environmental Justice (NEPA).

Summary of Growth-Inducing Impacts

As discussed in Section 6.3, the purpose of the proposed project is to correct a hundred and fifty years of increased sedimentation in Bolinas Lagoon by restoring the lagoon to a more self-sustaining condition. The project would have no discernible impact on economic development or population growth in the surrounding area. Marin County has strictly limited development in west Marin, and there are no elements of either project alternative that are expected to increase development in the project area, to extend urban services into west Marin, to remove obstacles to development, or to set a precedent for additional growth.

Summary of Significant Irreversible Changes or Irretrievable Commitments of Resources

Excavating in the PGC Delta, Kent Island, Dipsea Road, and the Highway 1 fills would produce a permanent change in those areas. Also, excavation of the North Basin, Main Channel, Bolinas Channel, and South Lagoon Channel would result in permanent changes to the lagoon's hydrology. This excavation would essentially be irreversible. The project would not require a large commitment of nonrenewable resources, other than the fuels required to power the project machinery, nor would it include highway construction or other improvements that would provide access to a previously inaccessible area.

ISSUES TO BE RESOLVED

The issues shown below remain to be resolved.

Choice of Alternative

The lead agencies must choose one of the alternatives described in Section 2 of this EIS/EIR, and decide upon appropriate mitigation to minimize the environmental impact of the chosen alternative. The lead agencies are not required to choose the environmentally superior/preferable alternative. If they do not choose the alternative with the least environmental impact, however, they must make specific findings regarding any significant impacts in order to support that choice. A mitigation and monitoring plan must be developed as well, in order to address any impacts that can be mitigated to a less than significant level.

Project Design

Project design issues must be resolved before construction can begin. Specifics that must be decided include the route by which upland soils will be taken for disposal, the

order of excavation, the periods during which excavation would take place in the lagoon, and an overall construction schedule.

Permitting

Required permits, including those from the Gulf of the Farallones National Marine Sanctuary, the National Marine Fisheries Service, the California Department of Fish and Game and the California Coastal Commission, must be completed before the project begins.

Mitigation and Monitoring Plans

The project proponents will need to adopt appropriate mitigation measures identified in this EIS/EIR and to prepare a mitigation and monitoring or reporting plan, as required by CEQA.

Consultation and Coordination (Chapter 7)

Federal, state, and local agencies were consulted prior to and during preparation of this EIS/EIR. Agencies were notified of the proposed project by mailings; by scheduled public meetings, by publication of an NOI/NOP announcing preparation of a joint EIS/EIR, as required by NEPA and CEQA; and by public scoping meetings. The agencies' viewpoints were solicited with regard to activities within their jurisdiction. A table in Chapter 7 provides a list of required consultation actions before the project can begin.

References, List of Preparers (Chapters 8, 9)

The final chapters of this EIS/EIR include a list of documents and personal communications used in the preparation of this document and a list of the preparers of this document and their qualifications.